



BANK
SAMPAH DIGITAL

RFM ANALYSIS
CUSTOMER SEGMENTATION



banksampah.digital

› IGNATIUS EVANS ERLANGGA

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Company Profile

What is Bank Sampah Digital ?

Bank Sampah Digital (BSD) is a technology-based social enterprise focused on dry waste management through a circular economy approach and community empowerment. Established in 2020, BSD has engaged over 4,000 households across the Greater Serang area (Serang City, Serang Regency, and Cilegon City) through 200 active waste bank units.

About The Company



Bank Sampah Digital's Core Mission:

- Environmental Preservation: Encouraging communities to sort and deposit waste from home, reducing the volume of waste ending up in landfills.
- Community Empowerment: Engaging local groups such as women's prayer groups, social gatherings, and youth communities in waste management activities.
- Economic Enhancement: Providing direct financial benefits through waste savings and other social programs



Company Profile

Bank Sampah Digital's Collaboration & Award

Strategic Collaborations

BSD partners with PT Indah Kiat Pulp & Paper (IKPP) Serang, a business unit of APP Sinar Mas, to supply recycled paper materials. Since October 2022, BSD has delivered over 20.5 tons of cardboard and waste paper to the IKPP factory.

Awards

At the 2023 National Waste Awareness Festival (FPSN) organized by the Ministry of Environment and Forestry (KLHK), BSD received an award as the 4th Best National Main Waste Bank in Indonesia for its outstanding contribution to community-based waste management.



About The Strategy

The Team behind Bank Sampah Digital



Prof. Dr. Ir. Reni Mayerni, M.P.
Deputi Pengkajian Strategik Lemhannas RI



Desty Eka Putri Sari
CEO Bank Sampah Digital



Dr. Novrizal Tahar
Direktur Pengelolaan Sampah, Dirjen PSLB3 KLHK RI



PESERTA FGD
Gedung Asta Gatra Lemhannas RI

Business Problem

Customer Segmentation

This project aims to provide a **comprehensive understanding of consumer waste collection trends** at Bank Sampah Digital (BSD). The insights gathered will enable BSD to identify which business areas should be further developed **to increase the frequency of waste collection by consumers**. Additionally, the project seeks to analyze **how the intensity of waste collection fluctuates over time**, helping BSD determine the periods when consumer participation is at its peak or at its lowest.

As a Data Analyst Intern, I will conduct **Customer Segmentation** using the **RFM (Recency, Frequency, Monetary) Analysis method** to generate actionable insights that effectively support the objectives of this project. Ultimately, the final output will be an **interactive dashboard delivered using Tableau software**.

About The Project



Project Workflow

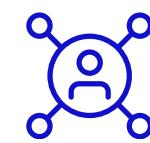
Project Execution Process

INTERNSHIP PROJECT TIMELINE

PROJECT TITLE	Internship Program			
PROJECT MANAG	Nazmi			
PHASE	STAGE	ACTIVITIES	DETAILS	OUTPUT
DURATION: 6 WEEKS				
1	Business Understanding & Requirement	Discussing Stakeholders	Define Business Problem	Notes
			Derive Specific Goal	Notes
			Conclude Objective	Notes
			Agreement Analytics	NDA
2	Data Preparation	Data Understanding	Define Information	Document
		Data Exploration	Technical Process Data to Data Store	Deskriptif Information
		Data Preprocessing (Data Cleaning, Handling Anomalies)	Technical Process to Handling Data Preprocessing	Data Cleaning
		Data Transformation (Feature Engineering)	Technical Process to Handling Data Transformation	
3	Data Analytics	Design Visualization Metrics	Build Design Dashboard with Business Intelligence Tool	Document
		Design Dashboard	Build Visualization with Business Intelligence Tool	Dashboard
		Testing & Validation Dashboard	Testing Functional Dashboard	Dashboard
4	Feedback	Update & Preparation Presentation	Checking Dashboard	
		Feedback & Final Evaluation	Update and Checking Final Report Analytics	Notes
		Final Project Presentation	Final Presentation	

About The Project

Project Execution Process



Step 1

Business Understanding
Obtaining information from the CEO of BSD regarding the dashboard objectives and identifying the appropriate metrics.



Step 2

Data Collection
Gathering relevant raw transactional data from the BSD Team to support dashboard development requirements.



Step 3

Data Preparation
Preparing and transforming raw data into analysis-ready formats, followed by data cleaning to ensure alignment with project objectives.



Step 4

Dashboard and Storytelling
Providing processed data in the form of a dynamic and interactive dashboard report, along with insights presented through storytelling that addresses the business questions from BSD.

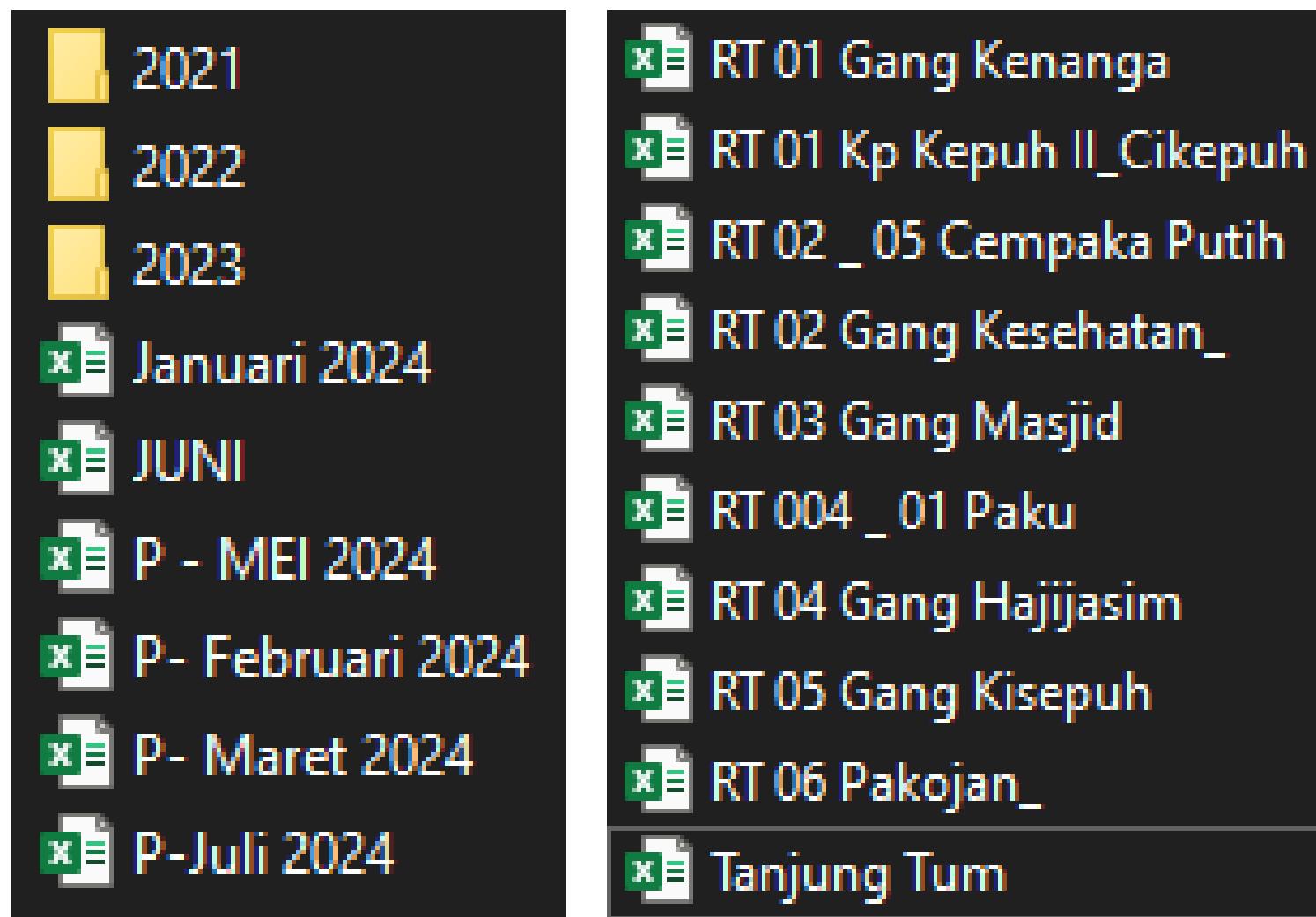
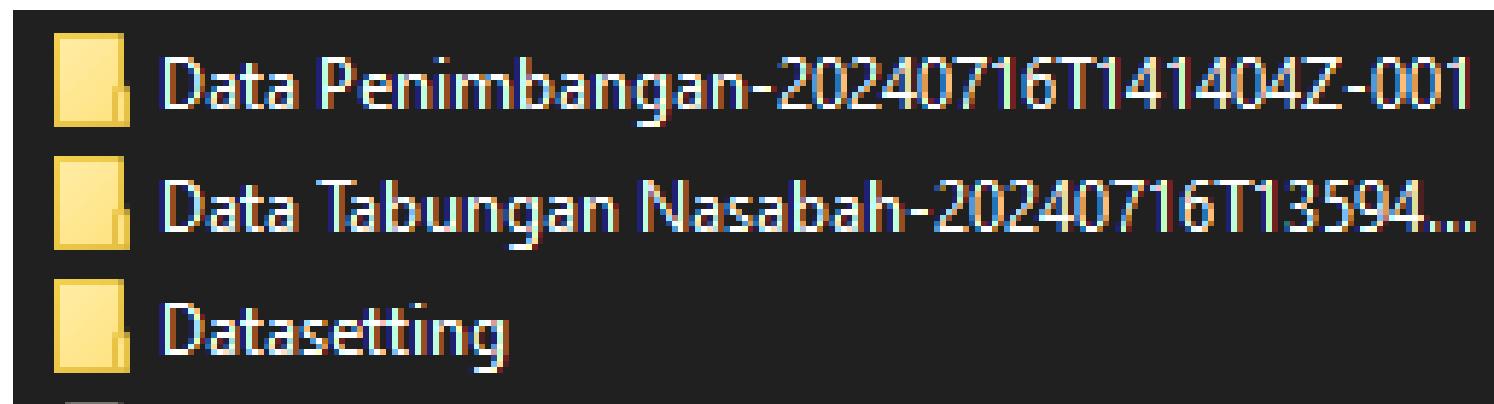
Business Understanding

This project is designed to offer an **in-depth analysis of consumer waste collection behaviors** at Bank Sampah Digital (BSD). By examining the data, we aim to uncover key insights that will help BSD **identify areas that require further development to encourage more frequent waste collection**. Additionally, the analysis will **track fluctuations in waste collection activity over time**, enabling BSD to determine when consumer engagement is at its highest and lowest points.

Following detailed discussions with the CEO of BSD, I identified and established the essential metrics needed to answer the business questions posed. These metrics will dictate the specific data required for further analysis and processing.

As a Data Analyst Intern, I will apply the **RFM (Recency, Frequency, Monetary) Analysis** technique to perform **customer segmentation**. This analysis will generate actionable insights that directly support the project's goals. The culmination of this work will be an **interactive dashboard**, developed using **Tableau**, to visualize and present the **insights**.

Data Collection



About The Data

The data collected from BSD is categorized into two main sections:

- **Weighing Data:** This dataset contains records of the waste weight collected by consumers. It captures detailed measurements of the waste brought in for collection.
- **Savings Data:** This dataset records the monetary value earned by consumers based on their waste contributions. The balance in each consumer's savings account is determined by both the weight and type of waste recorded in the weighing data.

In the following slide, I will present visualizations of sample contents from each of these data sections.

Step 2

About The Data

Data Collection

DAFTAR HARGA JENIS SAMPAH		Data Penimbangan Bulan 2024					
No	Nama Nasabah	Jenis Sampah	Jumlah	Harga	Jumlah Total	Jumlah Saldo	
1	Siti Maemunah	Gelas bersih	1,5	3.000	4500	44.100	
		Botol bersih	4	3.100	12400		
		Botol warna		800	0		
		Tutup botol	1	2.100	2100		
		Tutup galon		2.600	0		
		Emberan/Atum	14	800	11200		
		Kardus		1.500	0		
		Kertas Putih/ HV	1.300				
		Buku	1.000				
		Duplex	500				
		Alumunium	6.500				
		Besi	1.800				
		Kaleng kue/susu	1.300				
		Kaleng Minuman	5.000				
		Stanless	2.500				
		Aki Motor	9.000				
		Plastik Keresek	250				
		Beling	300				
		Paku	1.800				

Weighing Data

Rekap Barang	
Jenis sampah	Jumlah
Gelas bersih	3,5
Botol bersih	8
Botol warna	0
Tutup botol	2
Tutup galon	0
Emberan/Atum	17
Kardus	0
Kertas Putih/ HVS	0
Buku/LKS	0
Duplex	1
Alumunium	1
Besi	0
Kaleng kue/susu	6
Kaleng Minuman	0,5
Stanless	0
Aki Motor	0
Plastik Keresek	2,5
Beling	3,5

DAFTAR NASABAH BANK SAMPAH DIGITAL											
No	Nama Lengkap	Sisa Saldo 2022	Jan	Feb	Mart	April	Mei	Jun	Agustus	September	Oktober
1	Sarah	Rp 75.300	Rp 24.750				Rp 32.850				Rp 18.400
2	Masunah	Rp 418.150	Rp 61.750	Rp 32.250			Rp 46.000	Rp 52.800	Rp 50.350		Rp 33.650
3	Subandiah	Rp 173.350	Rp 22.550	Rp 27.000						Rp 33.000	
4	Turini	Rp 158.150	Rp 7.250				Rp 9.500		Rp 6.250	Rp 4.500	
5	Ahmad Samani	-									
6	E. Juhaesh	Rp 50.125	Rp 5.750	Rp 3.000	Rp 1.000		Rp 5.800		Rp 6.750		
7	Nurul Musfirah	Rp 57.300		Rp 16.750	Rp 15.100			Rp 8.200			
8	Ubaidilah	Rp 9.500	Rp 2.750					Rp 29.750			
9	Hj. Suyati	Rp 94.950		Rp 17.300			Rp 2.000		Rp 20.100		
10	Yani Apriyani Setiawan	-									
11	Rindiawati	-									
12	Hj Udhayah	Rp 54.250		Rp 5.500					Rp 29.250		
13	Tuftiyah	Rp 35.750	Rp 5.000	Rp 12.500					Rp 19.800		
14	Maspiah	Rp 42.850									
15	Venuza Widiastuti	Rp 18.500									
16	Martini	Rp 86.700									
17	Sali Salbiah	Rp 102.050	Rp 19.500	Rp 17.000			Rp 9.200	Rp 7.500			Rp 10.500
18	Eha Sulaeha	Rp 69.500	Rp 22.100					Rp 21.200		Rp 7.500	Rp 57.000

Savings Data

The dataset shown above comprises **raw transactional records accumulated over a four-year period**, spanning from the establishment of BSD to the year 2024. A preliminary visual examination suggests that the **current structure of the raw data is not adequately prepared for advanced analysis**. Consequently, **data restructuring and refinement are necessary**, and these processes will be undertaken in the subsequent step.

Step 3

Data Preparation

nama_costumer	nominal_setoran	bulan	tahun	jenis_kelamin	nomor_rt	lokasi_rt
Abdiah Jamilah	10000	April	2022	Wanita	RT 01	Gang Kenanga
Abdiah Jamilah	52050	May	2022	Wanita	RT 01	Gang Kenanga
Abdiah Jamilah	21600	July	2022	Wanita	RT 01	Gang Kenanga
Abdiah Jamilah	17250	November	2022	Wanita	RT 01	Gang Kenanga
Abdiah Jamilah	4000	March	2023	Wanita	RT 01	Gang Kenanga
Ade Supriono	7500	December	2021	Pria	RT 01	Gang Kenanga
Ade Supriono	60000	January	2022	Pria	RT 01	Gang Kenanga
Ade Supriono	25000	February	2022	Pria	RT 01	Gang Kenanga
Ade Supriono	3000	March	2022	Pria	RT 01	Gang Kenanga
Ade Supriono	16000	April	2022	Pria	RT 01	Gang Kenanga
Ade Supriono	6000	July	2022	Pria	RT 01	Gang Kenanga
Atin Handayanti	23000	December	2021	Wanita	RT 01	Gang Kenanga
Atin Handayanti	4000	January	2022	Wanita	RT 01	Gang Kenanga
Atin Handayanti	3000	February	2022	Wanita	RT 01	Gang Kenanga
Atin Handayanti	3250	May	2022	Wanita	RT 01	Gang Kenanga
Ayi Rohaet	16000	November	2021	Wanita	RT 01	Gang Kenanga
Ayi Rohaet	6500	December	2021	Wanita	RT 01	Gang Kenanga
Ayi Rohaet	10000	February	2022	Wanita	RT 01	Gang Kenanga
Ayi Rohaet	2000	May	2022	Wanita	RT 01	Gang Kenanga
Avi Rohaet	7000	June	2022	Wanita	RT 01	Gang Kenanga

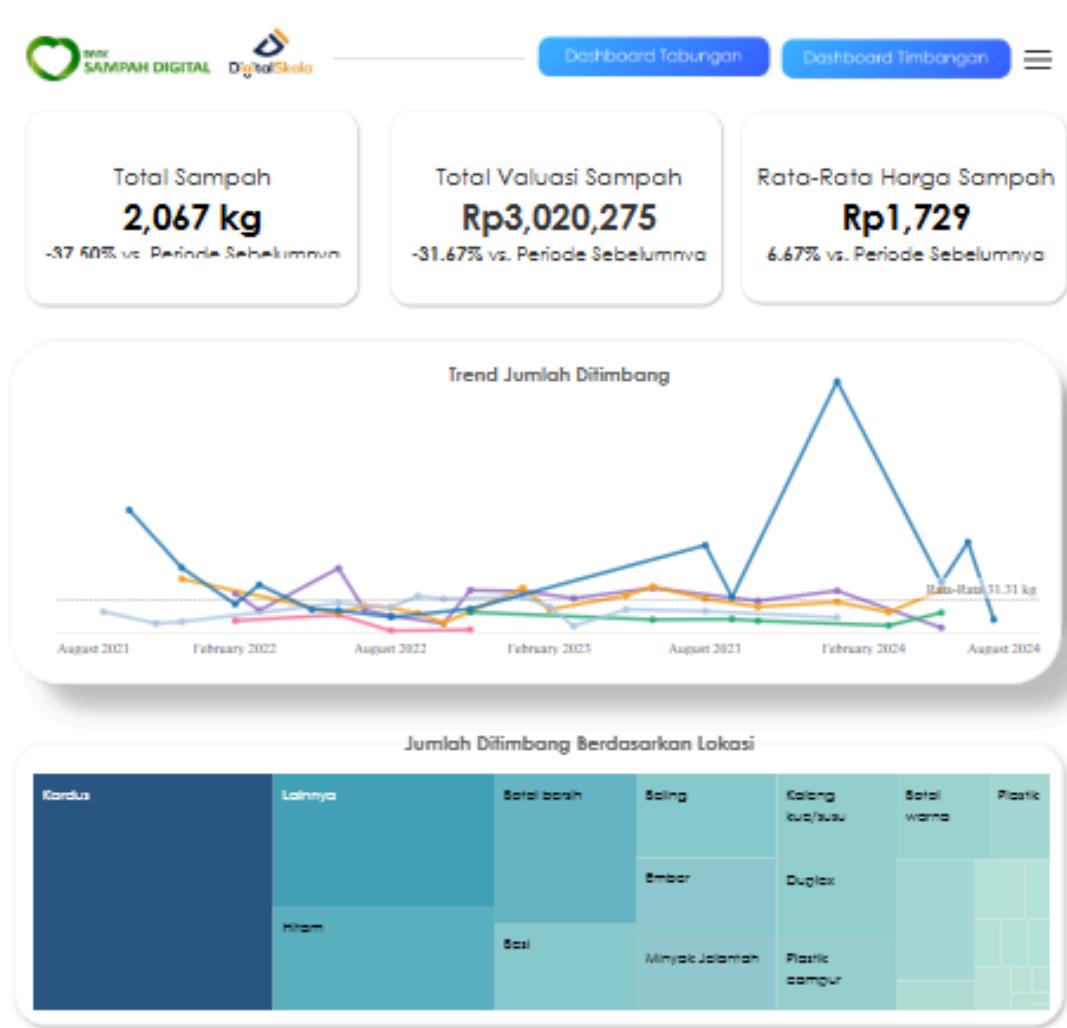
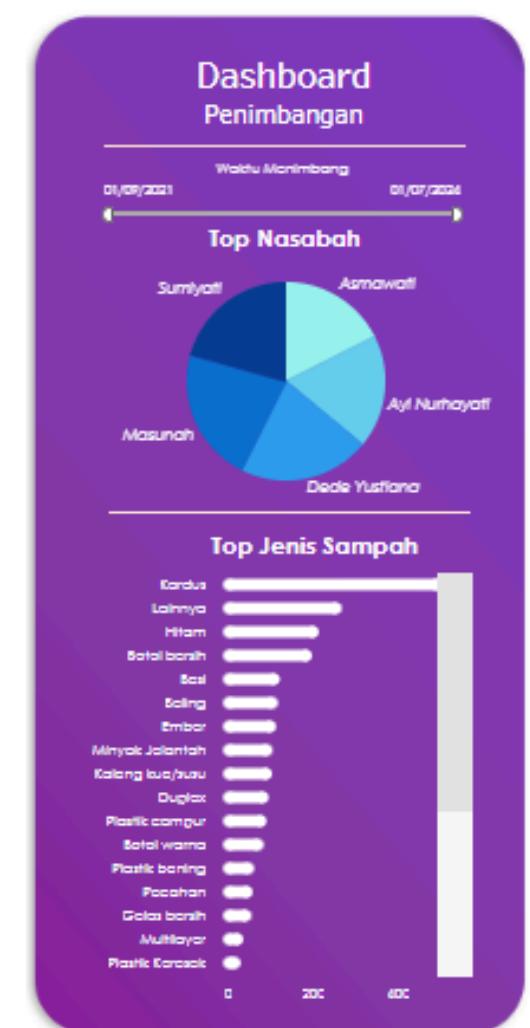
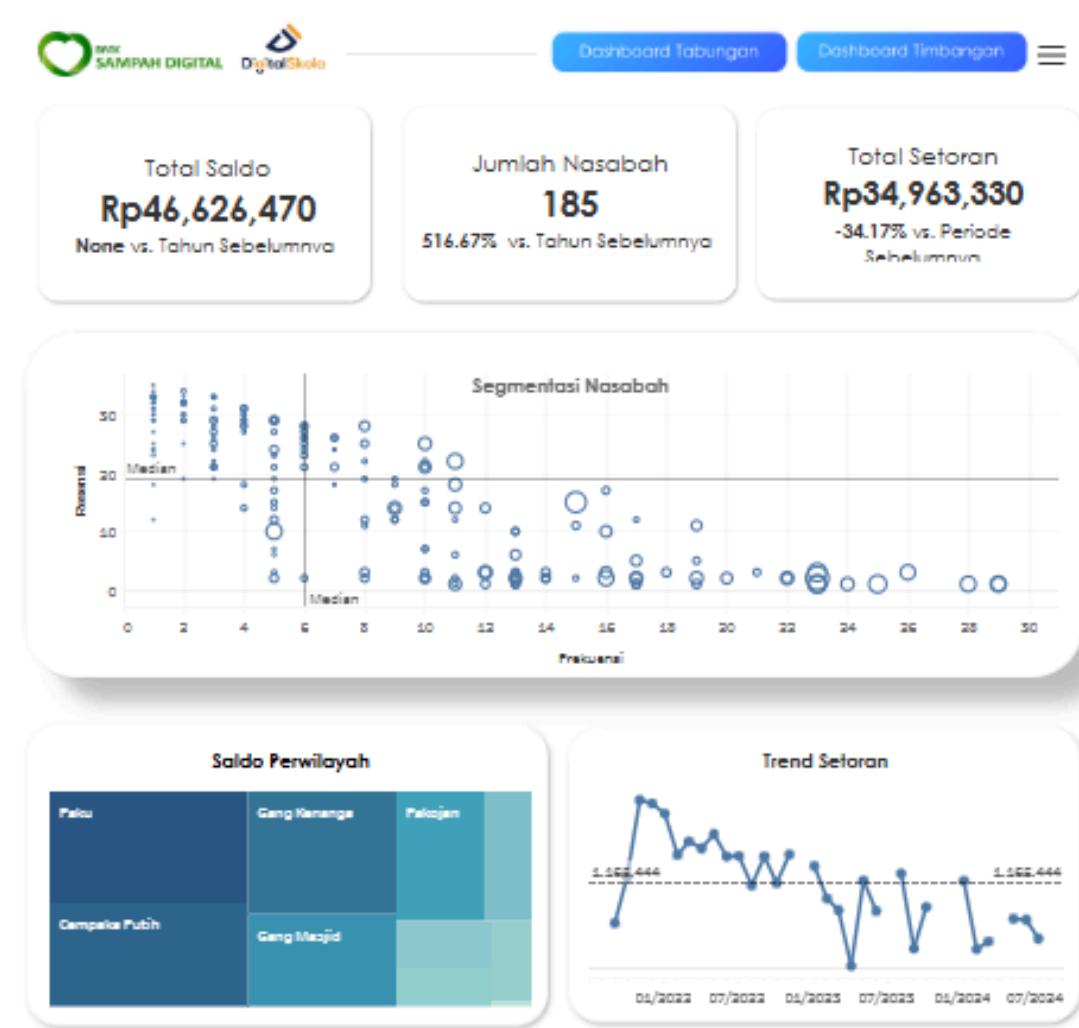
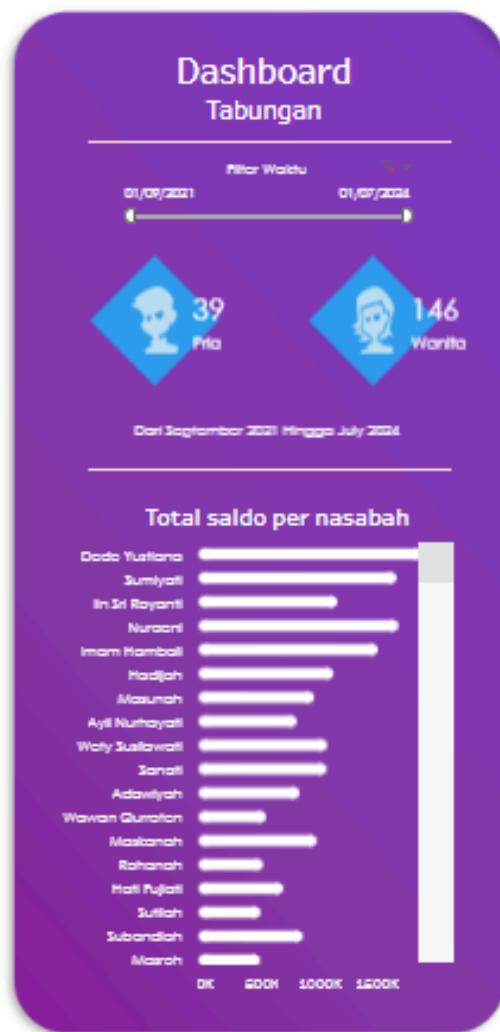
About The Data

The dataset presented here is the outcome of a series of data preparation procedures applied to the initial raw data:

- **Data consolidation** was performed using **Microsoft Excel Power Query** to integrate all records into a single, unified sheet.
- **Data restructuring** was conducted to organize the dataset into a coherent structure that facilitates advanced analysis.
- **Data cleaning** was carried out to eliminate irrelevant entries, including records with missing values and consumers who, despite being registered, did not engage in any transactions throughout the four-year period.

Step 4

Dashboard & Storytelling

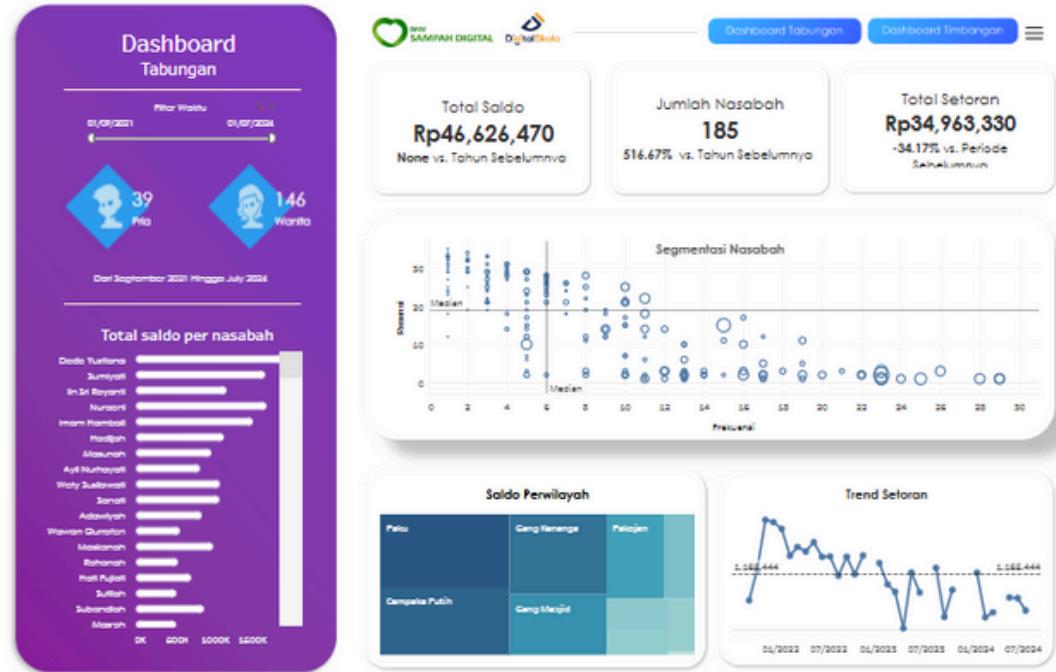


Customer Savings
Dashboard

Customer Weighing
Dashboard

About The Dashboard

Dashboard & Storytelling

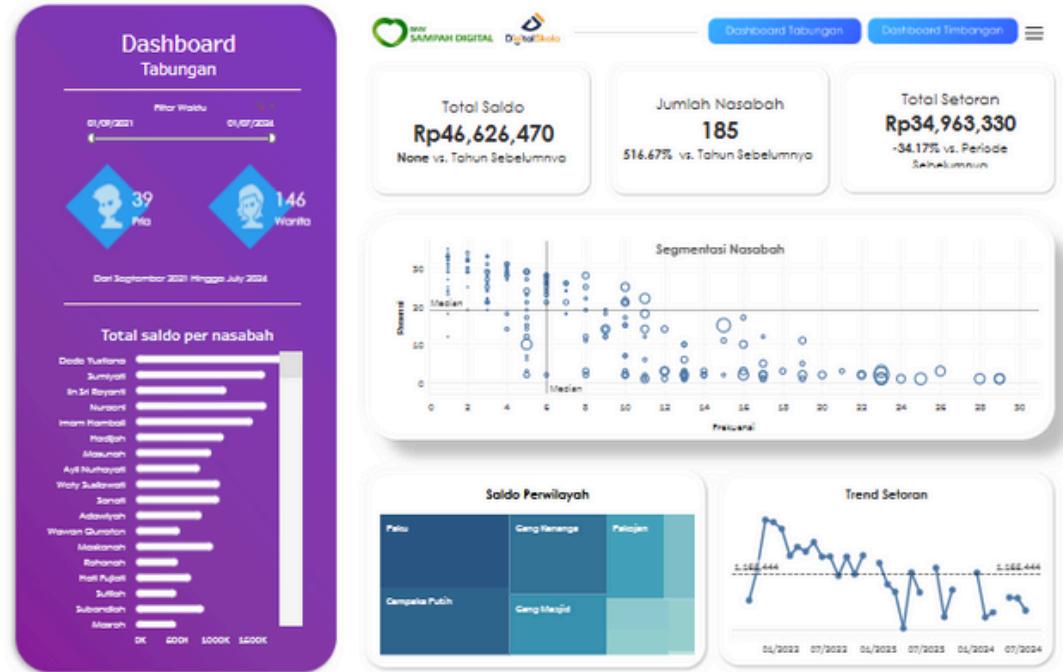


**Customer Savings
Dashboard**

Considering that the circle size represents the **Deposit Amount**, we gain a different perspective on the importance of each customer segment:

- **High Recency, Low Frequency** (Top-left quadrant): Despite low frequency, the significant transaction values of this segment result in a notable deposit contribution.
- **High Frequency, Low Recency** (Bottom-right quadrant): While individual transaction values are smaller, high transaction volume from many customers leads to a substantial deposit amount.
- **High Recency, High Frequency** (Top-right quadrant): This segment holds strategic value due to customer loyalty and high individual transaction values, though the total deposit may be lower due to fewer customers.
- **Low Recency, Low Frequency** (Bottom-left quadrant): This segment contributes the least to deposits and may require targeted strategies for improving engagement or retention.

Dashboard & Storytelling



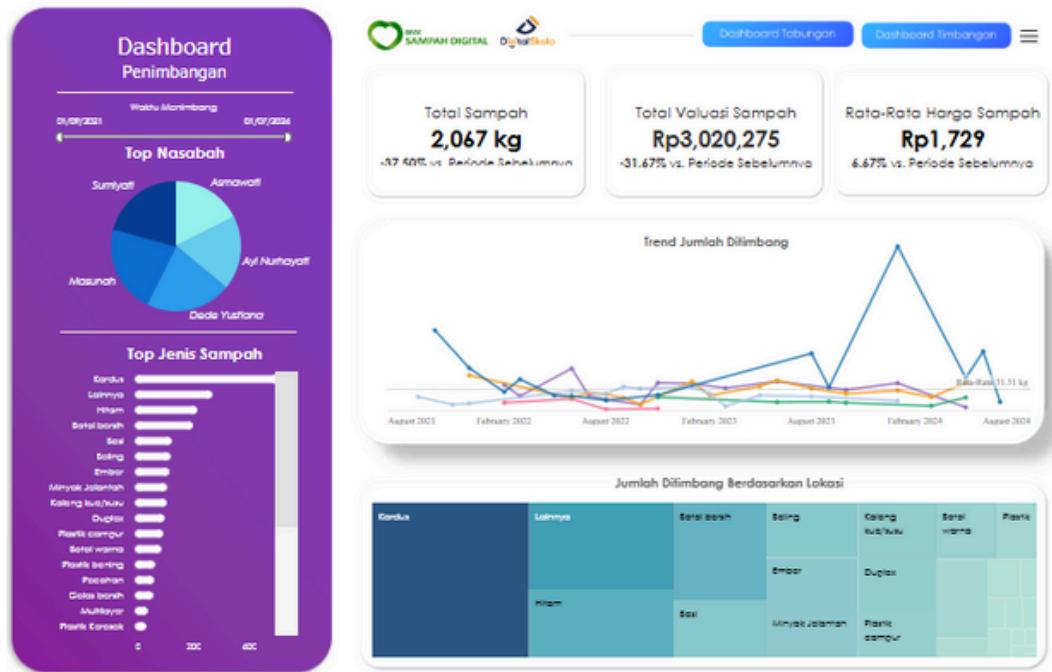
**Customer Savings
Dashboard**

Strategic Implications:

This analysis aids in prioritizing customer segments based on their financial contributions (deposit amounts). **Different strategies can be tailored for each segment**, such as:

- High Recency (Low/High Frequency): **Focus on retention**, service improvement, and higher-value product/service offerings.
- High Frequency (Low Recency): **Focus on increasing transaction value** per customer through upselling or additional offerings.
- High Recency and High Frequency: **Maintain loyalty** and leverage them as advocates or influencers.
- Low Recency and Low Frequency: Analyze the causes of low engagement and **design strategies to boost frequency** or transaction value, or consider cost-effective service options for this segment.

Dashboard & Storytelling



Customer Weighing
Dashboard

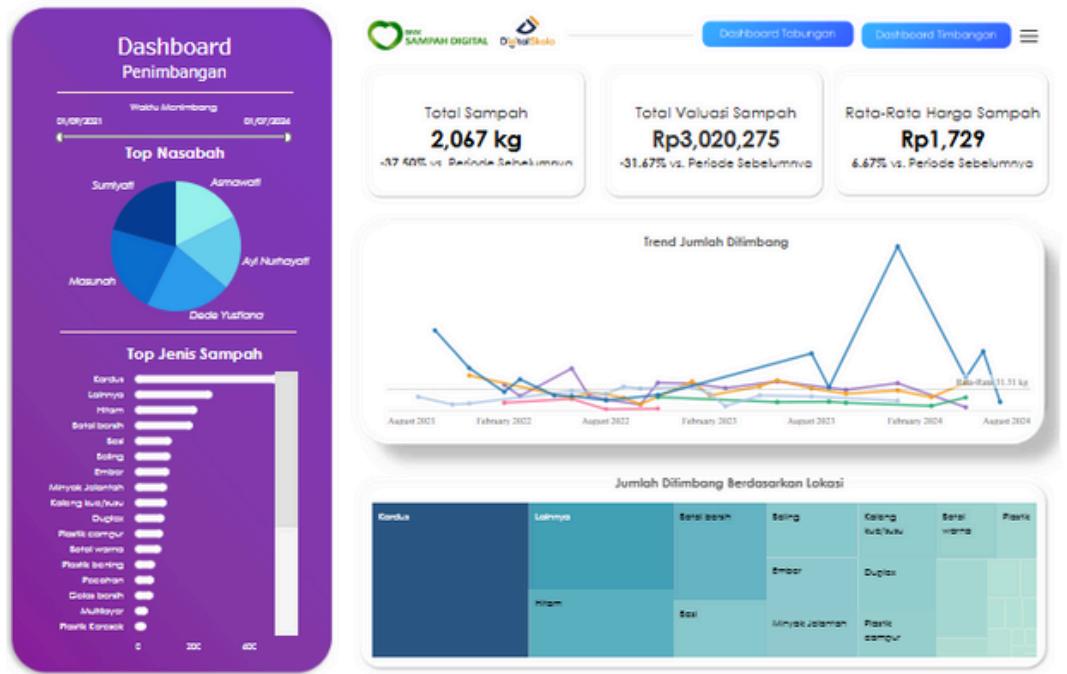
Regional Performance Comparison:

- Peak Performance:** Anyer RT 01 (blue) achieved the highest recorded weighing total in February 2024.
- Valley Performance:** Paku (purple) registered the lowest weighing total in August 2022.
- Stability:** Cempaka (orange) demonstrated the highest consistency in its weighing totals.
- Regions with Persistently Low Weighing Totals:** Anyer RT 03 (green) and Anyer RT 02 (light blue) consistently recorded below-average weighing totals, while Kepuh 2 (pink) also displayed a tendency toward lower totals.

Step 4

Analytics Section

Dashboard & Storytelling



**Customer Weighing
Dashboard**

Implications of Regional Analysis:

With this information, we can identify regions with the highest, lowest, and most stable weighing totals. This analysis aids in:

- Identifying specific factors in each region that influence weighing totals (e.g., population changes, economic activities, seasonality, etc.).
- Comparing performance across regions and identifying best practices from high-performing areas (e.g., Cempaka in terms of stability).
- Analyzing the causes of significant fluctuations in regions like Anyer RT 01 and Paku.
- Designing targeted strategies to improve weighing totals in regions with lower performance, such as Anyer RT 03, Anyer RT 02, and Kepuh 2.

Results

Key Insights from **Savings** Dashboard:

- High Recency, Low Frequency: Despite lower transaction frequency, this segment generates significant deposit amounts, highlighting high-value customers. Strategies should focus on retaining these high-contribution individuals.
- High Frequency, Low Recency: Large volumes of transactions from a broad customer base contribute to a substantial total deposit. Focus on upselling and introducing value-added services to increase individual transaction size.
- High Recency & Frequency: These segments exhibit high loyalty and strong individual transaction values, though the total deposit contribution may be smaller due to fewer customers. Leverage these customers as brand advocates to further drive engagement.
- Low Recency & Frequency: This group contributes the least to total deposits. A targeted approach is required to boost engagement, possibly through personalized offers or better incentives for frequent interaction.

Results

Strategic Recommendations for Savings:

- Prioritize retention strategies for high recency segments, offering enhanced services and personalized incentives to keep them engaged.
- Encourage higher transaction values in frequent but low-recency segments through targeted upselling and cross-selling.
- Foster deeper loyalty and turn high-recency, high-frequency customers into advocates to drive further growth.
- Address the underperformance in low recency and low frequency segments by identifying barriers to engagement and offering tailored incentives to increase activity.

Results

Key Insights from Weighing Dashboard:

- Peak Performance: Anyer RT 01 (blue) stands out with its highest recorded weighing total, demonstrating the potential for high engagement during certain periods. This area can serve as a model for other regions.
- Valley Performance: Paku (purple) registered the lowest totals, highlighting a region with significant engagement challenges. It's crucial to analyze the root causes and implement region-specific strategies.
- Stability: Cempaka (orange) stands out for its consistent performance, suggesting a strong, reliable base. Understanding the factors contributing to its stability can inform practices for other regions.
- Low, Consistent Performance: Regions such as Anyer RT 03 (green), Anyer RT 02 (light blue), and Kepuh 2 (pink) consistently show weak performance. These regions require targeted interventions, potentially through localized marketing or incentives to boost activity.

Results

Strategic Recommendations for Weighing:

- Identify and address region-specific factors such as local economic conditions or seasonal influences affecting performance.
- Learn from Cempaka's consistency to implement best practices in other regions, especially in terms of service delivery and community engagement.
- Investigate the fluctuations in regions like Anyer RT 01 and Paku to identify key drivers of performance and replicate successful practices in underperforming areas.
- Tailor strategies to improve performance in low-engagement regions by offering incentives, improving accessibility, or fostering local partnerships to increase participation.

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THANK YOU!



<https://github.com/evanserlangga/Portfolio>



<https://drive.google.com/drive/folders/1x1dcO58XjpokD4KDw4l0xtwmtpckQgW3?usp=sharing>

